

Kotzebue District Fisheries Report, 1996
to the
Alaska Board of Fisheries

By
Tracy Lingnau
and
Charles Lean

Regional Information Report¹ No. 3A97-16

Alaska Department of Fish and Game
Division of Commercial Fisheries, AYK Region
333 Raspberry Road
Anchorage, Alaska 99518-1599

February 1997

¹ The Regional Information Report Series was established in 1987 to provide an information access system for all unpublished divisional reports. These reports frequently serve diverse ad hoc informational purposes or archive basic uninterpreted data. To accommodate needs for up-to-date information, reports in this series may contain preliminary data; this information may be subsequently finalized and published in the formal literature. Consequently, these reports should not be cited without prior approval of the author of the Division of Commercial Fisheries.

OFFICE BOF EQUAL OPPORTUNITY (OEO) STATEMENT

The Alaska Department of Fish and Game conducts all programs and activities free from discrimination on the basis of sex, color, race, religion, national origin, age, marital status, pregnancy, parenthood or disability. For information on alternative formats available for this and other department publications, please contact the department ADA Coordinator at (voice) 907-465-4120, (TDD) 1-800-478-3648, or (fax) 907-586-6596. Any person who believes s/he has been discriminated against should write to: ADF&G, P.O. Box 25526, Juneau, AK 99802-5526; or O.E.O., U.S. Department of Interior, Washington, D.C. 20240.

TABLE OF CONTENTS

	Page
LIST OF TABLES	iv
LIST OF FIGURES	v
KOTZEBUE SOUND SEASON SUMMARY, 1995	1
History	1
General Information	1
Inseason Management	2
Commercial Season Summary	2
Enforcement	5
Sikusuilag Hatchery	5
Escapement	5
Dolly Varden	6
Freshwater Fisheries	6
1997 Outlook	6

LIST OF TABLES

Table	Page
1. Commercial catches of chum salmon, chinook salmon and Dolly Varden by period in the Kotzebue District, 1996	8
2. Kotzebue District chum salmon fishery information, 1981-1996 ..	9
3. Kotzebue Sound chum salmon 1996 commercial and 17 year average catch statistics (1979-1995)	10
4. Kotzebue District commercial chum salmon, chinook salmon and Dolly Varden catch by statistical area, 1996	11
5. Historical average age composition by period for the recent 17 years (1979-1995) and 1996	12
6. Kotzebue District commercial age and sex composition of chum salmon, 1962-1996	13
7. Kobuk River drift test fish historical mean daily CPUE and cumulative CPUE and CPUE proportions, 1993-1996	14
8. Kotzebue District winter commercial Sheefish harvest statistics, 1967-1996	15
9. Kotzebue District Subsistence Salmon Harvests, 1996	16

LIST OF FIGURES

Figure	Page
1. Kotzebue Sound commercial fishing district, villages and subsistence fishing areas, and major chum salmon spawning tributaries.	17
2. Kotzebue Sound commercial fishing subdistricts and statistical areas.	18
3. Kotzebue District previous 17 year average (1979-1995) and 1996 catch per unit effort comparisons.	19
4. Kotzebue District commercial chum salmon, and Dolly Varden catch by statistical area, 1996.	20
5. Kobuk River drift test fish cumulative CPUE for 1993-1996.	21
6. Kotzebue District peak aerial surveys of chum salmon in the Noatak, Squirrel, Salmon, Tutuksuk and Kobuk Mainstem Rivers.	22

1996 KOTZEBUE SOUND SALMON SEASON SUMMARY

History

The Kotzebue district supports the northernmost commercial salmon fishery in Alaska (Figure 1). The Kotzebue District is divided into three subdistricts. Subdistrict 1 contains six statistical areas (Figure 2).

The recent commercial fishery opened under state management in 1962. Salmon harvests consist of primarily chum salmon although limited amounts of Dolly Varden and a few chinook salmon are harvested as well. There are 215 commercial permit holders, of which an average of 146 were active over the ten year period 1986 to 1995. Eighty-seven percent of the permittees are residents of the district and 99 percent are residents of the state. Each commercial fisherman is limited to 150 fathoms of gear. These gillnets are generally operated as a single unit of gear, although the nets are occasionally broken down to single 50 fathom shackles. Most gillnets are made of 5-7/8 inch stretched measure multifilament web.

The earliest sales of salmon in the Kotzebue District were in 1909 when Lockhart's store purchased 21,906 pounds of salmon from local eskimoes and resold it at \$0.05/lb. Of that, 21,366 pounds were sold to gold miners on the Kobuk River drainage and 540 pounds were sold to a company in Seattle. A commercial fishery occurred from 1914 to 1918. Salmon were canned and the bulk of the harvest was thought to have been sold to miners working in the upper Kobuk River Drainage. The next organized commercial fishery began under state management in 1962 and continues to the present. The current fishery became fully developed in the mid- 1970s. The fishery displayed a gradually declining pattern of overall run strength with four year cycles of stronger followed by weaker returns. In 1987, the fisheries managers began a rebuilding program with an emphasis on attaining escapement goals. Prior to 1987, harvest had been proportional to total return. During the last few years, poor market conditions have caused harvests to fall short of their potential and consequently escapements have been very strong.

General Information

The Commercial harvest in the Kotzebue District (Figure 1) during 1996 consisted of 79,910 chum salmon, 3 chinook salmon, and 188 Dolly Varden (Table 1). This commercial chum harvest was substantially below the projected harvest of 250,000-350,000 salmon due to poor market conditions. It was also well below the 17 year (1979-1995) average of 283,000. There were 55 permits that fished this year. This is the lowest number of participants since 1969 (52). The low fishing effort is attributed to construction related

employment opportunities available in the region and the lowest price for salmon since 1965.

Gear is limited to set nets with an aggregate of no more than 150 fathoms per fisherman. Fishermen generally operate with one end on or near shore and with all three shackles connected. Fishermen also set in deeper channels in the mud flats further out from shore. Most gear used in the district is 5-7/8 in (14.9 cm) or 6 in (15.2 cm) stretch multifilament gill net.

From the onset of the commercial season, the district's only buyer requested a limited amount of fishing time because of poor chum salmon market conditions. All commercial openings were coordinated with the buyer so that fish in excess of his market's limitations would not be taken and the harvest could be shipped for processing in a timely manner. This procedure maintained the salmon catch at a high quality which enabled processors to market Kotzebue chum salmon. The processor indicated that he was working with a narrow margin of profit and a single delivery of poor quality fish could end the commercial fishery. A total of nineteen openings were fished in 1996 for a total of 132 hours. This is the fewest hours fished since the fisheries inception in 1962 and less than one-third of the historical average of 421. Commercial fishing periods varied from 4 hours to 24 hours in length during the 1996 season. As a result of short openings and low salmon prices, fishermen concentrated their efforts close to Kotzebue (Statistical Area 331-01) to minimize the costs of fuel and oil (Table 4, Figure 2).

The buyer purchased a total of 639,624 pounds of chum salmon (average weight 8.0) at \$.09 per pound, 51 pounds of chinook salmon (average weight 17.0) at an average of \$1.00 per pound, and 1,153 pounds of Dolly Varden (average weight 6.1) at an average of \$.25 per pound. The total ex-vessel value was \$56,273 to Kotzebue area fishermen with an average of \$1,023 for each participating permit holder (Table 2). The lone buyer packed the fish in ice and flew them out in the round to Anchorage for processing.

Inseason Management

Primary fishery management objectives were to provide adequate chum salmon escapement through the commercial fishery: (1) to ensure sustained runs by allowing adequate natural escapement, and (2) to meet subsistence harvest needs. Fishery management depended on comparing period and cumulative season catch rates to that of previous years. A comparison of catch rates over the history of the fishery has shown a close relationship to the total run strength. The lack of experienced sonar project leaders resulted in the Noatak River sonar not being operated in 1996. Noatak R. sonar escapement counts had been used with strong consideration in the management of the final third of the season.

Age composition of the catch was also closely monitored to determine the strength of age classes in the return. Older salmon tend to migrate into freshwater first, a fact that affects catch rate as the season progresses and influences the fishery managers evaluation of the catch statistics. Weak 4 year old age class contribution will tend to depress mid-season catches (Table 5, Figure 4).

A preseason meeting was held with fishermen to discuss inseason management. The buyer warned fishermen of the poor market conditions for chum salmon. Fishermen were told that periods would be shorter but more frequent as long as escapements were being achieved. This would ensure a marketable quality that would allow the fishery to continue. The buyer warned that a single period of poor quality fish could end the fishery in Kotzebue because of the narrow profit margins processors were working with. Because of the strong run and influence by markets, no other meeting was held by the department.

Contact with the Kobuk River subsistence fishermen with nets near Kiana was maintained throughout the season. A test fishery occurred for the fourth year on the Kobuk River, however, test fish indices were not used for management purposes because of the lack of historical data. Information from the Kobuk River test fishery will be available in report form on a later date. Because the Noatak River drift test net fishery in 1995 proved to be a misleading index of escapement, no project was conducted in 1996.

Commercial Season Summary

The Kotzebue Sound commercial salmon season was opened July 8 by emergency order as established by regulation. Generally, the first three periods are scheduled to be 24 hours in length. Trends in catch are used to assess the early portion of the run as there are no other indicators. There are normally two openings per week beginning on Monday and Thursday. However, with limited markets for chum salmon and only one buyer, these openings were shortened as requested by the buyer. Commercial openings were coordinated between the processor, local buyer and the Fish and Game office. Once a fishing period was decided on, the department would fax or call in a Public Service Announcement (PSA) to the local radio station which then would air the announcement. Fishermen were told that announcements would be made before 9:00 a.m. PSA's were made on a daily basis announcing openings and hours. Announcements were made even if there was no fishing.

Prior to the season the buyer contacted the department concerning the possibility of using an average weight as the basis to determine total catch of all chum salmon by individual permit holders. The processor and local buyer were working with a narrow profit margin and were using any means available to reduce the cost

of handling fish. The buyer began using an average weight during the second opening of 8 pounds from the first opening. According to Alaska Statute 16.10.270 (a), averaging the individual salmon can be done if the "primary fish buyer and the seller agree in writing upon a sample weighing technique that will fairly determine the average weight of the fish purchased". Fishermen agreed to this and the buyer continued purchasing fish in this manner for the remainder of the season.

Commercial catch statistics from openings on Monday, Tuesday and Wednesday were combined to compare historical data for the first opening of the week. Statistics from openings on Thursday, Friday and Saturday were combined to compare historical data for the second opening of the week (Table 3, Figure 3). This was done to compare this year's more frequent openings to historical bi-weekly period data. Even with drastically reduced fishing time and few permits fishing, the first week's catches were at or above the 17 year average. Catch rates were 4 and 10 times the 17 year average. As the fishing season continued with a low number of fishermen and significantly reduced hours, commercial catches remained well below the historical average. Catch rates however, remained well above the average for the duration of the season. The length of openings ranged from 4 hours to 24 hours with most being 6 hours or 8 hours in length. Only the final opening was 24 hours but began as a 6 hour opening and was extended to 24 hours.

On July 22, the buyer held a fishermen's meeting to discuss worsening market conditions. He explained that there was a significant amount of fish placed on the market from hatcheries in Southeast Alaska. With the high freight costs from Kotzebue to Anchorage, the processor could not compete with fish harvested in other areas of the state which could deliver fish to markets at a much lower cost. The local representative explained that the only way his processor could continue buying fish from Kotzebue fishermen was to reduce the price from \$1.00 per fish (\$.125/lb) to \$.60 per fish (\$.075/lb). Fishermen discussed the issue and agreed they would continue to fish as long as periods remained frequent. The department had little concern with escapement as all indications were that the run was at least average and most likely well above average. The final opening was held on August 23.

Age-5 salmon tend to dominate the earlier commercial openings with the younger age classes moving through during the middle and latter portion of the fishery. In 1996, Age-5 salmon dominated the first two-thirds of the season while Age-4 salmon dominated the final third of the season. The presence of age-6 salmon was significantly higher than the historical average throughout the season. Historical comparisons indicate that age-6 salmon were almost five times more abundant than the historic average contribution with only 1987 having a greater abundance with 11 percent. There were also numerous 7 year old chum salmon sampled which are normally quite rare. Age-3 salmon remained well below

average the entire season. This may be the result of a continuing trend of older fish returning to spawn (Table 6). Commercial fishermen were contracted to test fish for age and sex composition during closed periods.

In recent years, the department has made an effort to estimate the subsistence salmon harvest. Harvest information on sheefish and Dolly Varden were collected in some communities in conjunction with this effort. Two methods were used to generate these estimates: 1) post-season household surveys were conducted in Noatak, Noorvik, Kiana, Ambler, Shungnak, and Kobuk, and 2) a postcard survey was used in Kotzebue. The communities of Shishmaref, Wales, Diomedes, Deering, Buckland, Selawik, Kivalina, and Point Hope were not surveyed.

The post-season household surveys are used to generate estimates of total harvest in communities small enough to be surveyed door to door. These communities were chosen on the basis of their dependence on chum salmon. Kotzebue is also known to utilize many chum salmon on a per capita basis, but the size of the community makes it impractical to conduct household surveys in the same manner. A postcard survey was deemed the most practical method given the logistical and budgetary constraints of the situation. An average of 90 percent of the households in each community were contacted using the household survey method. In Kotzebue, postcards were mailed to 710 households, of which 171 responded (24 percent).

Subsistence fishers of the Kotzebue District were estimated to have harvested 100,235 salmon, of which 97,954 were chum salmon (Table 9). The community of Kotzebue had the largest estimated harvest of 51,876 salmon and an estimated chum salmon harvest of 50,573. The large harvest from Kotzebue is closely tied to the size of the community. The outlying communities generally show slightly higher rate of harvest per household. Comparable harvest estimates have been made in the district since 1994 and indicate a trend of relatively constant subsistence harvests in the communities surveyed.

Enforcement

This was the first year since 1993 that a Fish and Wildlife Protection enforcement was stationed in Kotzebue. Patrols were conducted via airplane during openings and closures. A total of three citations and two warnings were issued. Two citations were for fishing late and one for wanton waste. One warning was given for fishing late and another warning for unmarked gear.

Sikusuilag Hatchery

The total predicted return of hatchery salmon was 90,000. Sixty-

nine percent of the commercial catch was sampled with a total of 17 adipose clipped chum salmon found. From the 17 heads sent in, only 5 were found with tags. Three of the tags were from the 1990 brood year and two were from 1991. Using the confirmed tag data, the estimated contribution of hatchery salmon to the commercial catch was 495. This number does not include salmon from the brood year of 1992 as those fry were not tagged.

Escapement

A test fishing project located in Kiana monitored salmon run strength and timing into the Kobuk River. The test fish crews in Kiana also interviewed subsistence fishermen to monitor subsistence catches. No inseason salmon escapement monitoring project was operated on the Noatak River in 1996.

The test fish index from the Kobuk River was the highest since 1993, the inception of the project (Table 7, Figure 5). Water conditions varied from low and clear to high and muddy. Clear water net avoidance was significantly buffered because of the tannic stained water of the Kobuk River. In the past three years, water conditions have ranged from high and muddy to low and clear. Test fish indices have remained stable inseason, no matter the water condition, for the past three years. In 1993, a cumulative index of 494 was achieved. That same year, escapement goals by aerial survey overall were just met. In 1995, the cumulative test fish index doubled 1993. That same year, escapement goals by aerial survey were doubled as well. This year the cumulative test fish index was 5 times the 1993 index. Escapements by aerial survey were roughly 4 to 5 times greater than established goals. This indicates that this project is consistent and viable for use in management decisions.

Aerial survey conditions were more typical this year than most. Normal dry weather early in the season allowed preliminary surveys to be flown on tributaries with early runs. Clear late fall weather allowed peak surveys on tributaries with later spawning salmon. In general, escapement goals by aerial survey were exceeded on all tributaries by four times the published goals with the exception of the Squirrel River. That tributary's escapement was twice the goal by aerial survey (Figure 6).

Subsistence catches of chum salmon by numerous fishermen were some of the earliest recorded. However, spawn timing of salmon by aerial survey was normal. This would indicate that the run was protracted. The Kobuk River test fishing data suggested a protracted run timing as well with a near linear line without an incline at the beginning or a decline at the end of the run. The department again missed an opportunity to compare aerial survey counts to sonar counts and to enumerate a near total escapement in the Noatak River drainage.

Dolly Varden

Dolly Varden (locally called trout) typically migrate along the northern shore of Kotzebue Sound. Because of reduced hours, few fishermen and a concentration of effort near Kotzebue, the incidental catch of trout was significantly reduced. Only 188 Dolly Varden were sold, even though the average price for trout was \$.25, three times that of chum salmon. The incidental harvest has been as much as 7,700 in previous years but averages around 2,000.

Spawners and over-wintering Dolly Varden normally migrate through the northern side of the district during the third week of August.

Freshwater Fisheries

Limited commercial harvest of miscellaneous finfish has been allowed since statehood, normally under the auspices of a permit which delineates harvest levels, open areas, legal gear, etc. There was no reported commercial harvest of whitefish, pike, or burbot during the 1996 commercial season. Sheefish are caught and sold predominantly between mid-November and late March. There were eight permit holders, of which four were registered with the Fish and Game office. Two of those reported a harvest of 308 fish weighing 3,002 pounds (9.7 lb. average) with a value of \$1,308.50 (Table 8).

1997 Outlook

The outlook for the 1997 season is based on the returning age classes of the 1996 season. During the 1997 season, the four year component of the return is expected to be near average, while the five and six year old components are expected to be above average. The three year old component is generally small, and it too is likely to be near average. The commercial harvest is expected to fall within the range of 250,000 to 350,000 chum salmon, if market conditions can accept that level of harvest.

Table 1. Commercial catches of chum salmon, chinook salmon and Dolly Varden by period in the Kotzebue District, 1996.

Period	Date	Hours Fished	Number of Fishermen	Chum			Chinook			Dolly Varden		
				Number	Pounds	Avg. Wt.	Number	Pounds	Avg. Wt.	Number	Pounds	Avg. Wt.
1	08-Jul-96	4	6	841	7,055	8.4						
2	09-Jul-96	6	8	2,192	17,536	8.0 ^b	1	20	20.0			
3	10-Jul-96	8	8	2,831	22,648	8.0 ^b						
4	11-Jul-96	8	15	4,872	38,976	8.0 ^b						
5	17-Jul-96	4	28	3,590	28,720	8.0 ^b						
6	18-Jul-96	4	33	5,722	45,776	8.0 ^b						
7	23-Jul-96	6	13	3,561	28,488	8.0 ^b				1	7	7.0
8	24-Jul-96	8	16	4,859	38,888	8.0 ^b						
9	25-Jul-96	8	8	2,357	18,856	8.0 ^b	1	6	6.0			
10	26-Jul-96	8	24	7,830	62,640	8.0 ^b						
11	29-Jul-96	6	15	4,811	38,488	8.0 ^b						
12	05-Aug-96 ^a	6	24	10,322	82,576	8.0 ^b				3	17	5.7
13	06-Aug-96	6	18	9,779	78,233	8.0 ^b				7	42	6.0
14	14-Aug-96	4	Buyer did not purchase fish									
15	16-Aug-96	4	12	4,679	37,432	8.0 ^b				41	214	5.2
16	19-Aug-96	6	10	1,283	10,264	8.0 ^b				7	51	7.3
17	20-Aug-96	6	11	2,700	21,600	8.0 ^b				45	270	6.0
18	21-Aug-96	6	2	394	3,152	8.0 ^b				2	15	7.5
19	23-Aug-96	24	14	7,287	58,296	8.0 ^b	1	25	25.0	82	537	6.5
Totals		132	55	79,910	639,624	8.0	3	51	17.0	188	1,153	6.1

^a Does not include 2,200 chum salmon that were commercially caught but not sold or harvested for subsistence.

^b No salmon were weighed. An average weight of 8 pounds was assumed.

Table 2. Kotzebue District chum salmon fishery information, 1981-1996.

Commercial Catch	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
Chum (in thousands)	677.2	417.8	175.8	320.2	521.4	261.4	109.5	352.9	254.6	163.3	239.9	289.2	71.1	149.5	290.7	79.9
Number of permits	187	199	189	181	189	187	160	193	165	153	143	149	114	109	92	55
Average catch per permit	3,621	2,099	930	1,769	2,759	1,398	684	1,828	1,543	1,067	1,678	1,941	623	1,371	3,160	1,453
Est. value (x 1,000)	\$ 3,247	\$ 1,962	\$ 421	\$ 1,149	\$ 2,137	\$ 933	\$ 515	\$ 2,605	\$ 614	\$ 438	\$ 429	\$ 527	\$ 231	\$ 234	\$ 316	\$ 56
Est. value per fisherman (x 1,000)	\$ 17.4	\$ 9.9	\$ 2.2	\$ 6.3	\$ 11.3	\$ 5.0	\$ 3.2	\$ 13.5	\$ 3.7	\$ 2.9	\$ 3.0	\$ 3.5	\$ 2.0	\$ 2.1	\$ 3.4	\$ 1.0

Escapement ^a

Noatak	106,513	20,682 ^c	78,900	67,800	43,526 ^c	37,277 ^c	5,565 ^c	45,930 ^c	^b	23,345 ^c	80,750	34,335 ^c	30,210 ^c	^b	155,920	338,367
Upper Kobuk	8,648	14,674	33,746	10,621	6,200 ^c	6,015 ^c	8,210	11,895		14,935 ^c	24,645	10,935 ^c	11,334		32,361	74,770
Squirrel	9,854	7,690	6,075	5,473	6,145	4,982 ^c	2,708	4,848 ^c		5,500 ^c	4,606	2,765	4,463		10,605	21,805
Salmon	4,709	1,871 ^d	1,677	1,471	2,816	1,971 ^c	3,333	6,208		6,335 ^c	5,845	1,345	13,880		13,988	23,790
Tutulukuk	1,114	1,322	2,637	1,132	5,100	4,257	206 ^c	3,122		2,275 ^c	744	1,162	1,996		3,901	10,740
Total	130,838	46,239	123,035	86,497	63,787	54,502	20,022	72,003		52,390	116,590	50,542	61,883		216,775	469,472

Escapement Goals

Noatak River (mouth to Kelly Bar)	80,000
Upper Kobuk (Kobuk Village to Beaver Creek)	10,000
Squirrel River	11,500
Salmon River	7,000
Tutulukuk River	2,000
Total	110,500

^a Peak aerial survey

^b Aerial surveys not feasible due to unfavorable weather and water conditions.

^c Poor aerial survey conditions.

^d Foot surveys.

Table 3. Kotzebue Sound chum salmon 1996 commercial and 17 year average catch statistics (1979-1995).^a

17 Year Avg.					Cumulative			
Period	Hours	Number Permits	Catch	CPUE	Prop. Catch	Catch	CPUE	Prop. Catch
1	24	39	3,103	3.6	0.011	2,921	3.6	0.011
2	24	65	5,402	4.1	0.019	8,323	3.9	0.030
3	24	89	10,520	5.7	0.037	18,842	4.7	0.076
4	25	109	18,863	7.0	0.067	37,705	5.6	0.144
5	26	121	23,174	8.8	0.082	60,880	6.4	0.229
6	28	128	30,658	14.2	0.108	87,931	7.1	0.321
7	34	131	36,978	11.8	0.131	122,734	7.8	0.459
8	35	136	38,869	14.0	0.137	159,306	8.1	0.582
9	38	128	38,295	11.7	0.135	197,611	8.5	0.730
10	36	130	42,662	15.8	0.151	235,254	8.8	0.828
11	39	120	24,710	8.5	0.087	255,603	8.7	0.906
12	40	105	15,337	6.8	0.054	268,233	8.5	0.950
13	40	80	10,418	4.1	0.037	276,813	8.1	0.980
14	37	61	7,186	4.3	0.025	281,040	7.9	0.994
15	37	37	3,297	4.7	0.012	282,785	7.8	1.000

1996					Cumulative			
Period	Hours	Number Permits	Catch	CPUE	Prop. Catch	Catch	CPUE	Prop. Catch
1	26	13	5,864	17.3	0.073	5,864	17.3	0.073
2	8	15	4,872	40.6	0.061	10,736	23.4	0.134
3	4	28	3,590	32.1	0.045	14,326	25.1	0.179
4	4	33	5,722	43.3	0.072	20,048	28.6	0.251
5	14	21	8,420	28.6	0.105	28,468	28.6	0.356
6	16	24	10,187	26.5	0.127	38,655	28.0	0.484
7	6	15	4,811	53.5	0.060	43,466	29.6	0.544
8	Commercial Test Fish					43,466		0.544
9 ^a	28	12	20,101	59.8	0.252	63,567	35.2	0.795
10	Commercial Test Fish					63,567		0.795
11	Commercial Test Fish					63,567		0.795
12	4	12	4,679	97.5	0.059	68,246	36.8	0.854
13	12	13	4,377	28.1	0.055	72,623	36.1	0.909
14	24	14	7,287	21.7	0.091	79,910	34.1	1.000
15	Commercial Test Fish					79,910		1.000

^a Does not include 2,200 chum salmon commercially caught but not sold or taken for subsistence.

Table 4. Kotzebue District commercial chum salmon, chinook salmon, and Dolly Varden catch by statistical area, 1996.

Statistical Area	Chum CPUE	Number of Fishermen	Chum			Chinook			Dolly Varden		
			Number	Pounds	Avg. Wt.	Number	Pounds	Avg. Wt.	Number	Pounds	Avg. Wt.
331-01 ^a	9.5	50	62,459	500,000	8.01	2	26	13.0	133	814	6.1
331-02	7.5	8	7,873	63,000	8.00				41	268	6.5
331-03	7.9	6	6,270	50,160	8.00						
331-04	2.8	5	1,866	14,928	8.00	1	25	25.0			
331-05	1.1	1	146	1,168	8.00				14	71	5.1
331-06	3.3	3	1,296	10,368	8.00						
Totals	11.0	55	79,910	639,624	8.00	3	51	17.00	188	1,153	6.13

^a Does not include 2,200 chum salmon that were commercially caught but not sold or used for subsistence.

Table 5. Historical average age composition by period for the recent 17 years (1979-1995) and 1996.

17 Year Avg.		Percent				Catch by Age			
Period	Catch	3	4	5	6	3	4	5	6
1	3,103	0.4	33.9	61.3	4.4	12	1,052	1,902	137
2	5,402	0.8	40.3	54.5	4.3	43	2,177	2,944	232
3	10,520	1.4	41.4	51.4	5.7	147	4,355	5,407	600
4	18,863	1.3	49.8	45.5	3.4	245	9,394	8,583	641
5	23,174	1.5	48.5	45.6	4.5	348	11,239	10,567	1,043
6	30,658	1.8	54.8	40.9	2.5	552	16,801	12,539	766
7	36,978	2.7	58.3	37.0	2.1	998	21,558	13,682	777
8	38,869	4.4	61.9	32.0	1.8	1,710	24,060	12,438	700
9	38,295	5.5	59.9	32.4	2.3	2,106	22,939	12,408	881
10	42,662	5.7	62.8	30.1	1.4	2,432	26,792	12,841	597
11	24,710	11.2	65.5	22.7	1.1	2,768	16,185	5,609	272
12	15,337	11.5	60.4	26.2	2.0	1,764	9,264	4,018	307
13	10,418	11.2	62.8	24.5	1.5	1,167	6,543	2,552	156
14	7,186	9.7	61.4	27.8	1.1	697	4,412	1,998	79
15	3,297	4.7	67.6	26.6	1.2	155	2,229	877	40

1996		Percent				Catch by Age			
Period	Catch	3	4	5	6	3	4	5	6
1	5,864	0.1	17.8	68.0	12.4	6	1,044	3,988	727
2	4,872	0.0	27.4	54.7	17.9	0	1,335	2,665	872
3	3,590	0.0	24.0	67.4	8.2	0	862	2,420	294
4	5,722	0.0	27.0	61.8	11.2	0	1,545	3,536	641
5	8,420	0.0	29.6	57.3	12.8	0	2,492	4,825	1,078
6	10,187	1.1	41.6	51.3	5.5	112	4,238	5,226	560
7	4,811	0.8	33.9	48.3	16.9	38	1,631	2,324	813
8	^a	0.6	45.9	45.9	7.6				
9	20,101	0.7	45.0	47.0	6.7	141	9,045	9,447	1,347
10	^a	0.5	53.0	42.2	4.3				
11	^a	1.3	47.7	45.1	5.9				
12	4,679	4.0	59.1	35.6	1.3	187	2,765	1,666	61
13	4,377	3.1	57.6	30.1	9.2	136	2,521	1,317	403
14	7,287	1.4	58.9	32.9	6.8	102	4,292	2,397	496
15	^a	1.5	54.5	40.3	3.7				

^a No commercial fishing occurred. Percent age composition is from commercial test gillnets.

Table 6. Kotzebue District commercial age and sex composition of chum salmon, 1962-1996. ^a

Year	Sample Size	Percent		Percent Age Class				
		Males	Females	Age-3	Age-4	Age-5	Age-6	Age-7
1962	69	26.1	73.9	7.2	63.8	27.5	1.4	0.0
1963	255	34.9	65.1	30.2	51.0	18.4	0.4	0.0
1964	463	43.6	56.4	52.9	44.9	1.7	0.4	0.0
1965	480	42.1	57.9	2.3	91.0	6.7	0.0	0.0
1966	430	40.2	59.8	10.0	67.2	22.8	0.0	0.0
1967	1,865	37.3	62.7	8.8	72.2	18.5	0.5	0.0
1968	1,989	48.2	51.8	21.2	58.1	19.8	0.9	0.0
1969	1,125	53.7	46.3	36.8	58.3	4.9	0.0	0.0
1970	267	45.3	54.7	3.7	91.0	5.2	0.0	0.0
1971	1,105	54.6	45.4	7.1	66.8	26.1	0.0	0.0
1972	980	50.9	49.1	15.8	59.5	24.1	0.6	0.0
1973	598	46.0	54.0	16.7	69.4	13.9	0.0	0.0
1974	350	47.1	52.9	28.6	63.4	7.7	0.3	0.0
1975	340	46.5	53.5	2.6	86.8	10.6	0.0	0.0
1976	566	47.9	52.1	11.1	51.4	37.3	0.2	0.0
1977	446	49.3	50.7	6.7	72.9	18.6	1.8	0.0
1978	579	49.9	50.1	10.5	57.5	31.8	0.2	0.0
1979 ^b	658	53.3	46.7	30.5	53.2	15.2	1.1	0.0
1980 ^c	710	56.3	43.7	15.1	78.2	6.6	0.1	0.0
1981 ^d	1,167	52.4	47.6	2.4	67.1	30.5	0.0	0.0
1982	983	48.8	51.2	5.9	48.3	40.3	5.5	0.0
1983 ^e	1,979	43.4	56.6	5.8	57.7	34.2	2.3	0.0
1984 ^f	2,933	50.2	49.8	14.6	64.4	19.7	1.3	0.0
1985 ^g	3,293	47.8	52.2	0.4	83.7	15.5	0.4	0.0
1986 ^h	3,095	46.0	54.0	0.3	18.6	78.9	2.2	0.0
1987 ⁱ	1,987	52.0	48.0	15.0	43.0	31.0	11.0	0.0
1988	3,324	48.0	52.0	6.5	74.8	16.9	1.7	0.1
1989	3,336	49.3	50.7	0.7	77.9	20.4	1.0	0.0
1990 ^j	2,497	49.4	50.6	2.3	45.6	50.7	1.4	0.0
1991	3,292	46.4	53.6	2.9	60.4	35.8	0.9	0.0
1992 ^k	3,706	39.0	61.0	0.9	58.5	37.5	3.1	0.0
1993 ^l	3,707	50.9	49.1	2.9	26.3	66.5	4.2	0.1
1994 ^m	3,744	44.8	55.2	3.3	63.0	30.8	2.9	0.0
1995	4,621	50.9	49.1	2.3	59.8	36.0	1.9	0.0
17 Year Avg. (1979-1995)		47.6	52.4	7.0	59.0	32.0	2.0	0.0
1996 ⁿ	2,386	50.9	49.1	0.9	36.9	52.3	9.5	0.4

^a Commercial periods not sampled for years 1962 to 1978 are unknown.^b Commercial openings 1 and 10 not sampled due to period closure.^c Commercial openings 8, 13, and 15 not sampled due to period closure.^d Commercial openings 8, 10, 12, and 14 not sampled due to period closure.^e Commercial openings 11, 13, 14, and 15 not sampled due to period closure.^f Commercial openings 14 and 15 not sampled due to period closure.^g Commercial openings 1, 3, 5, 7, 9, 11, and 13 not sampled due to period closure.^h Commercial opening 15 not sampled due to period closure.ⁱ Commercial openings 1, 2, 4, 6, 7, 8, 10, 11, 14, and 15 not sampled due to period closure.^j Commercial openings 11 to 15 not sampled due to period closure.^k Commercial opening 12 was not sampled due to period closure.^l Commercial openings 6, 8, 10, 11, 12, 13, 14 and 15 were closed periods. Closed periods were sampled for age and sex composition from commercial test nets and are included in the 1993 data.^m Commercial openings 14 and 15 were closed periods. Closed periods were sampled for age and sex composition from commercial test nets and are included in the 1994 data.ⁿ The equivalent of commercial periods 8, 10, 11 and 15 were closed periods. These periods were sampled for age composition from commercial test nets and are included in the 1996 data.

Table 7. Kobuk River drift test fish historical mean daily CPUE and cumulative CPUE, 1993-1996.

Date	1993		1994		1995		1996	
	Daily	Cum.	Daily	Cum.	Daily	Cum.	Daily	Cum.
5-Jul-96								
6-Jul-96								
7-Jul-96								
8-Jul-96								
9-Jul-96							12.77	12.77
10-Jul-96							15.00	27.77
11-Jul-96							98.38	126.15
12-Jul-96	11.18	11.18			0.00	0.00	45.54	171.69
13-Jul-96	14.22	25.40	0.00	0.00	0.93	0.93	74.29	245.98
14-Jul-96	20.57	45.97	2.68	2.68	2.80	3.73		245.98
15-Jul-96	35.08	81.05	2.58	5.26	2.77	6.50	83.75	329.73
16-Jul-96	13.19	94.24	11.35	16.61		6.50	71.35	401.08
17-Jul-96	17.27	111.51		16.61	0.00	6.50	55.49	456.57
18-Jul-96		111.51	7.16	23.77	1.81	8.31	89.86	546.43
19-Jul-96	10.71	122.22	12.40	36.17	9.89	18.20	54.74	601.17
20-Jul-96	2.76	124.98 +	3.65	39.82	16.30	34.50	63.70	664.87 +
21-Jul-96	3.20	128.18	7.30	47.12	38.54	73.04	52.12	716.99
22-Jul-96	5.52	133.70	3.56	50.68	21.18	94.22	50.97	767.96
23-Jul-96	27.15	160.85	16.49	67.17	50.58	144.80	91.36	859.32
24-Jul-96	9.06	169.91		67.17	28.46	173.26	91.89	951.21
25-Jul-96		169.91	14.38	81.55	40.16	213.42	76.80	1,028.01
26-Jul-96	15.22	185.13	47.65	129.20	35.15	248.57	55.68	1,083.69
27-Jul-96	8.06	193.19	40.66	169.86	63.94	312.51 +	29.79	1,113.48
28-Jul-96	16.36	209.55	57.83	227.69	62.49	375.00	49.06	1,162.54
29-Jul-96	0.93	210.48	33.62	261.31	46.11	421.11	70.13	1,232.67
30-Jul-96	0.92	211.40	69.21	330.52 +	57.86	478.97	35.29	1,267.96
31-Jul-96	12.58	223.98		330.52	29.89	508.86	82.27	1,350.23 *
1-Aug-96		223.98	82.16	412.68	72.91	581.77	167.67	1,517.90
2-Aug-96	6.74	230.72	65.12	477.80	48.71	630.48 *	62.02	1,579.92
3-Aug-96	54.49	285.21 *	71.79	549.59	48.40	678.88	48.70	1,628.62
4-Aug-96	44.23	329.44	108.98	658.57 *	53.00	731.88	65.93	1,694.55
5-Aug-96	89.30	418.74 +	59.74	718.31	49.95	781.83	60.33	1,754.88
6-Aug-96	18.60	437.34	102.56	820.87		781.83	80.47	1,835.35
7-Aug-96	20.52	457.86		820.87	46.39	828.22	90.99	1,926.34 +
8-Aug-96		457.86	62.75	883.62	44.02	872.24	146.94	2,073.28
9-Aug-96	1.84	459.70	96.86	980.48 +	68.22	940.46 +	106.11	2,179.39
10-Aug-96	12.63	472.33	45.83	1,026.31	56.33	996.79	56.95	2,236.34
11-Aug-96	18.11	490.44	57.02	1,083.33	37.95	1,034.74		2,236.34
12-Aug-96	3.74	494.18	90.54	1,173.87	63.92	1,098.66	72.29	2,308.63
13-Aug-96			11.36	1,185.23		1,098.66	114.63	2,423.26
14-Aug-96				1,185.23	29.35	1,128.01	158.13	2,581.39
15-Aug-96			5.13	1,190.36	25.26	1,153.27		
16-Aug-96			16.23	1,206.59	35.04	1,188.31		
17-Aug-96			0.00	1,206.59				
18-Aug-96			0.00	1,206.59				
19-Aug-96			3.12	1,209.71				
20-Aug-96			0.00	1,209.71				
21-Aug-96				1,209.71				
22-Aug-96			0.00	1,209.71				
23-Aug-96			0.00	1,209.71				
24-Aug-96			0.00	1,209.71				
25-Aug-96			0.91	1,210.62				
26-Aug-96			5.56	1,216.18				
27-Aug-96			1.86	1,218.04				
28-Aug-96			0.93	1,218.97				
29-Aug-96			0.00	1,218.97				
30-Aug-96			0.00	1,218.97				

* Regular day off.

The "+" indicate the first and third quartiles and "*" indicates the mid-way point.

Table 8. Kotzebue District winter commercial Sheefish harvest statistics, 1967-1996. ^a

Year ^b	No. of Fishermen	No. of Fish	Pounds		Price/ Pound	Estimated Value
			Total	Average		
1967 ^c		4,000	26,000	6.5	\$0.20	\$5,200.00
1968	10	792	4,752	6.0	\$0.22	\$1,045.44
1969	17	2,340	15,209	6.5	\$0.25	\$3,802.25
1970 ^c		2,206		0.0	\$0.14	
1971	4	73	720	9.9	\$0.13	\$93.60
1972	5	456	4,071	8.9	\$0.16	\$651.36
1973	11	2,322	15,604	6.7	\$0.20	\$3,120.80
1974	6	1,080 ^d	6,265	5.8	\$0.30	\$1,879.50
1975	^c	2,543 ^d	24,161	9.5	\$0.30	\$7,248.30
1976	14	2,633	19,484	7.4	\$0.30	\$5,845.20
1977	2	566	5,004	8.8	\$0.30	\$1,501.20
1978	11	2,879	26,200	9.1	\$0.40	\$10,480.00
1979 ^c						
1980	4	1,175	8,225	7.0	\$0.50	\$4,112.50
1981	1	278	1,836	6.6	\$0.75	\$1,377.00
1982	11	2,629 ^f	17,376	6.6	\$0.75	\$13,032.00
1983	8	1,424	13,395	9.4	\$0.50	\$6,697.50
1984	5	927 ^d	10,403	11.2	\$0.55	\$5,721.65
1985	4	342 ^d	3,902	11.4	\$0.51	\$1,990.02
1986	2	26	312	12.0	\$0.75	\$234.00
1987	3	670	5,414	8.1	\$0.49	\$2,652.86
1988	3	943	7,373	7.8	\$0.45	\$3,317.85
1989	8	2,335	16,749	7.2	\$0.51	\$8,541.99
1990 ^c	6	687	5,617	8.2		
1991	5	852	8,224	9.7	\$0.50	\$4,112.00
1992	3	289	2,850	9.9	\$0.65	\$1,852.50
1993	1	210 ^d	1,700	8.1	\$0.50	\$850.00
1994 ^e						
1995	1	161	1,840	11.4	\$0.50	\$920.00
1996	2	308	3,002	9.7	\$0.44	\$1,308.50

^a Data is not exact, in some instances total catch poundage was determined from average weight and catch data. Similarly, various price/pound figures were determined from price/fish and average weight data.

^b Season was from October 1 to September 30. Year indicated would be the year the commercial season ended. For example, the year 1980 would represent October 1, 1979 to September 30, 1980.

^c Data unavailable or incomplete.

^d Number of fish or pounds not always reported. Estimates were based on average weight from other reported sales which documented the number and weight of fish.

^e No reported commercial catches.

^f Estimate based on historical average weight.

Table 9. Kotzebue District Subsistence Salmon Harvests, 1996.

	Chinook				Chum		Pink		Sockeye		Coho		Total	
	Total	HH's	Reported	Est.	Reported	Est.	Reported	Est.	Reported	Est.	Reported	Est.	Reported	Est.
	HH's	Contacted	Harvest	Total	Harvest	Total	Harvest	Total	Harvest	Total	Harvest	Total	Harvest	Total
Ambler	82	80	1	1	7774	7940	63	64	2	2	0	0	7840	8007
Kiana ¹	103	88	5	6	3208	5899	0	0	0	0	10	12	3223	5917
Kobuk	24	22	0	0	1622	1819	0	0	0	0	1	1	1623	1821
Kotzebue ²	710	170	121	505	12109	50573	69	288	112	468	10	42	12421	51876
Noorvik	124	111	31	38	12609	13347	566	596	0	0	243	256	13449	14237
Noatak	88	74	0	0	8996	10091	0	0	1	1	0	0	8997	10092
Shungnak	56	51	0	0	7306	8095	0	0	0	0	0	0	7306	8095
KOTZEBUE SOUND	1187	596	158	550	53624	97764	698	949	115	471	264	311	54859	100045

¹ Kiana estimated chum harvest includes 2,053 chum from the ADF&G test net fishery in addition to the survey results.

² Alaska Department of Fish and Game, Division of Subsistence, baseline harvest survey, 1996.

SOURCE: Alaska Department of Fish and Game, Division of Subsistence, household surveys, 1996.

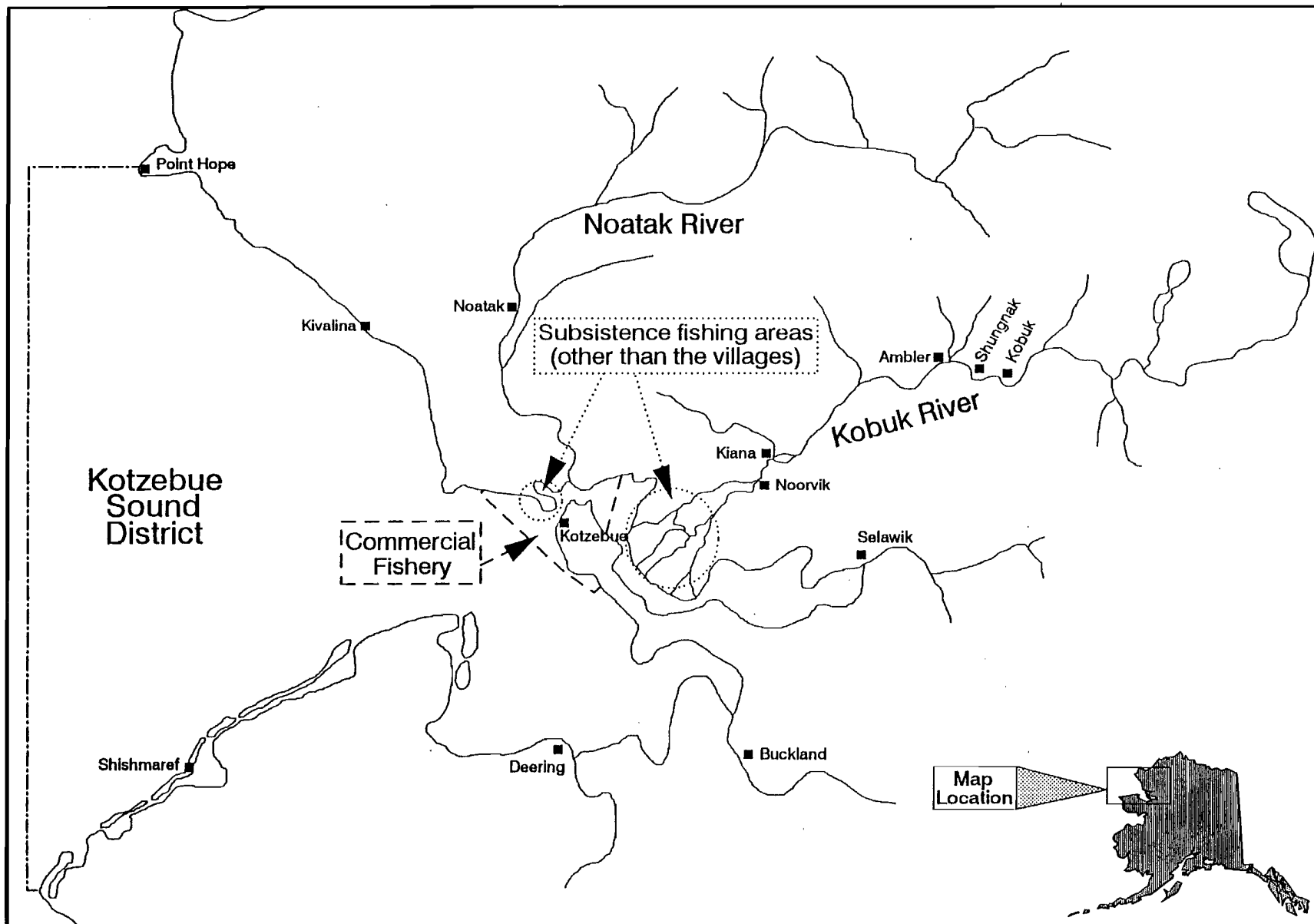


Figure 1. Kotzebue Sound commercial fishing district, villages and subsistence fishing areas.

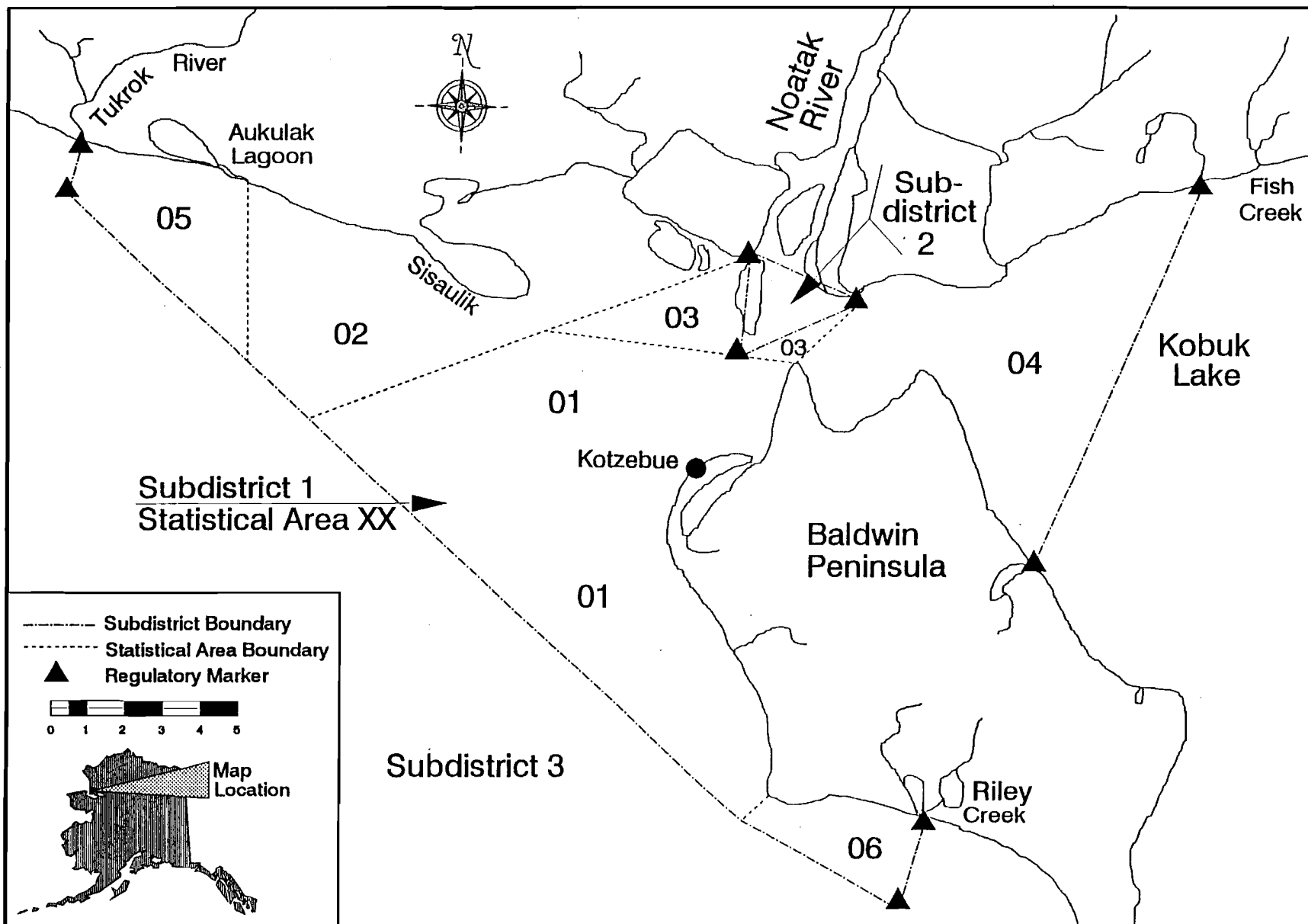


Figure 2. Kotzebue Sound commercial fishing subdistricts and statistical areas.

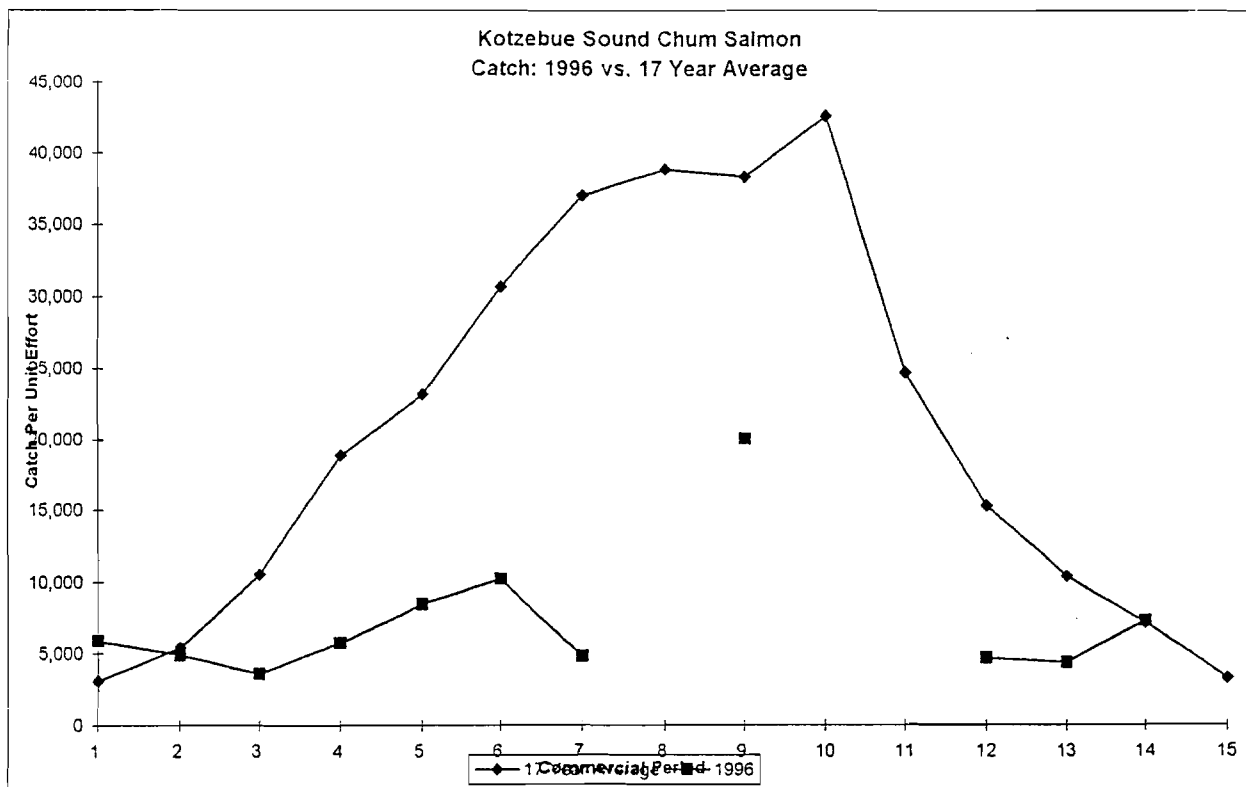
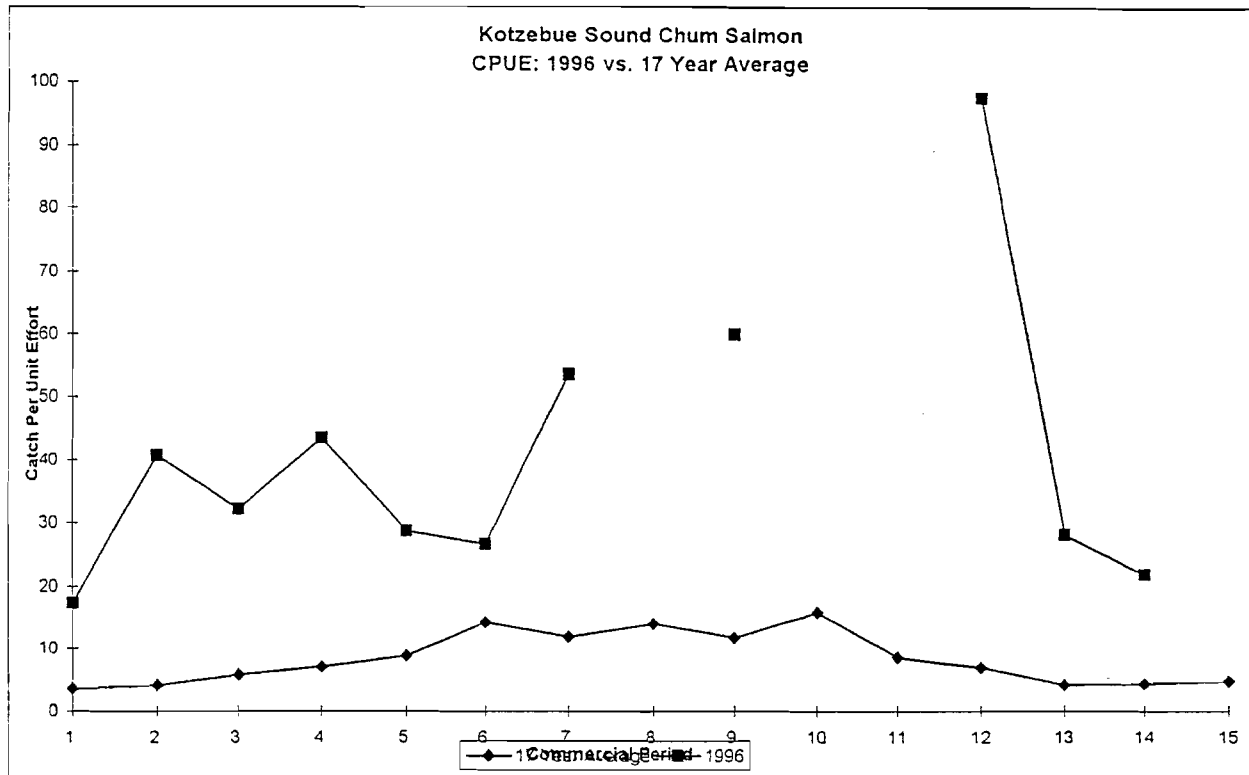
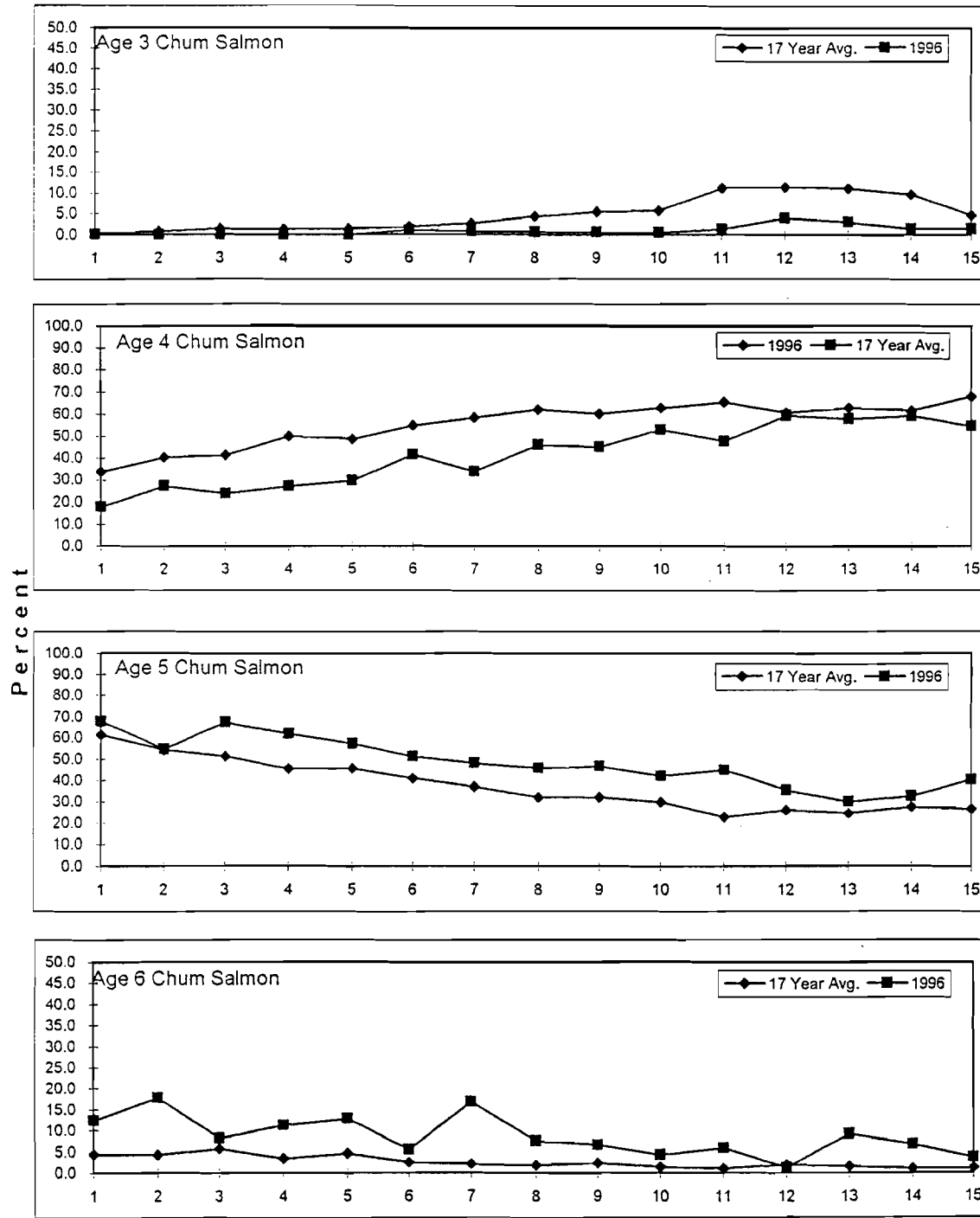


Figure 3. Kotzebue District previous 17 year average (1979-1995) and 1996 catch and catch per unit comparisons.

Kotzebue Sound Commercial Chum Salmon



Commercial Fishing Period

Figure 4. Kotzebue District commercial chum salmon percent age composition, comparing 1996 to the 17 year his-
torical average (1979-1995).

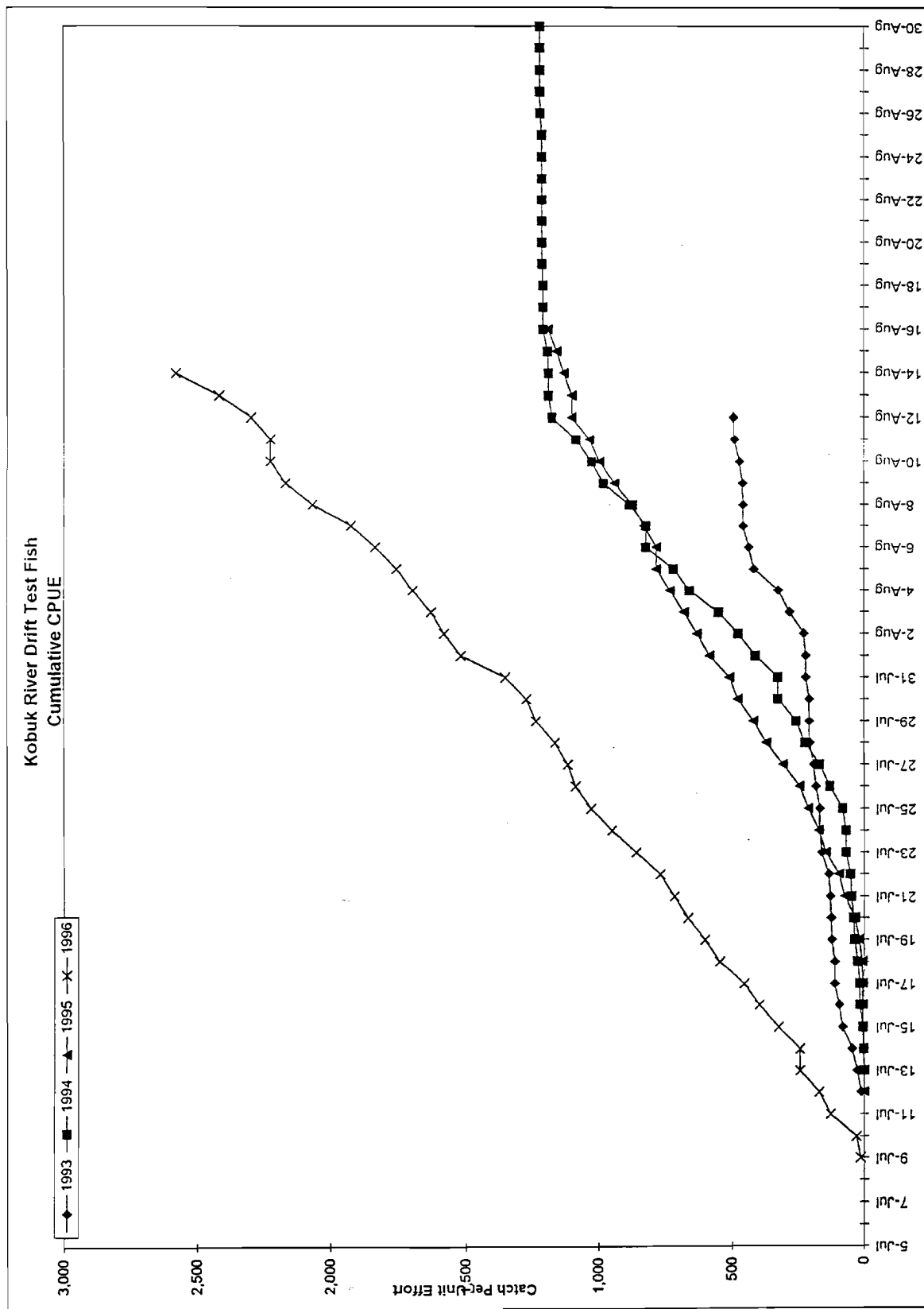


Figure 5. Kobuk River chum salmon drift test fish cumulative CPUE, 1993-1996.

Kotzebue District Historical Chum Salmon Aerial Surveys

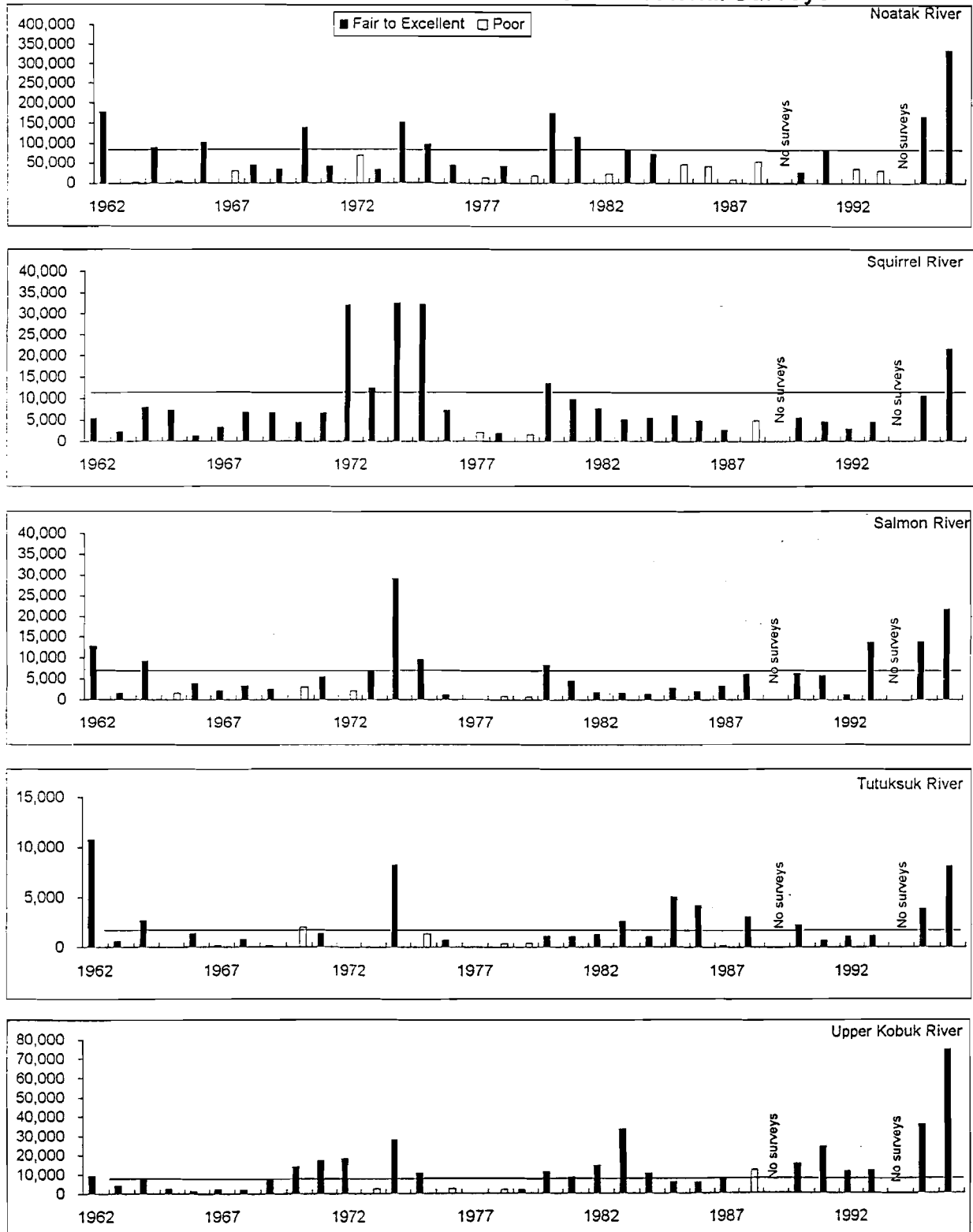


Figure 6. Kotzebue District peak aerial surveys of chum salmon in the Noatak, Squirrel, Salmon, Tutuksuk and Upper Kobuk Rivers. (The horizontal line indicates the escapement goals for these rivers. These goals were established in the mid-1980's using limited information. No aerial surveys were conducted in 1989 or 1994 due to poor weather.)